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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,503	10/23/2003	J-Cherng Chen	3313-1048P	6047

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EXAMINER
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LAM, CATHY FONG FONG

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 02/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/690,503

Applicant(s)

CHEN ET AL

Examiner

Cathy Lam

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-21, 24-27 and 30-41 is/are pending in the application.
- 4a) Of the above claim(s) 1-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 20, 21, 24-27 and 30-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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In view of the amendment and remarks filed on November 17, 2004, the pending claims are continued to be unpatentable as following:

***Election/Restrictions***

1. This application contains claims 1-19 drawn to an invention nonelected with traverse in paper filed on November 17, 2004. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

2. The previously stated 112 rejections have been withdrawn.

***Claim Rejections - 35 USC § 112***

3. Claims 32-41 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The substances of the newly added claims are not mentioned anywhere in the specification.

***Claim Rejections - 35 USC § 102/103***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 20-21, 24-27 and 30-41 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Wagner et al (Applied Physics Letters).

Wagner discloses a crystalline growth of a metal alloy from vapor, onto a substrate. The metal alloy after continuous depositing becomes a silicon whisker.

Silicon and gold impurity formed a liquid alloy which was deposited in a small globule onto a silicon substrate, and after continuously depositing the liquid alloy, little by little, a nano-whisker is formed (ie. the nanowire is formed by continuous deposit of the liquid alloy which atop the growing whisker). The liquid alloy resembles the surface nanometer functional structure as claimed by the applicant.

The examiner takes the position that the silicon whisker resembles the nanowires and has a longitudinal axis which passes through a center of the nanostructure. The nanowires (ie. silicon whiskers) are formed onto a silicon substrate.

The continuous depositing steps resembles the more than one layer of surface nanometer functional structure on the substrate (as in claims 20 & 27).

The examiner also takes the position that the globules are the nanodots which has a non-linear structure and that this liquid alloy is a self-assembling reaction layer.

Since the nanowire is formed by continuous growing of the alloy droplets, it would be obvious that the nanometer functional structure is a homogeneous layer

because for one layer to grow onto another layer, they need to have at least the same crystalline lattice structure.

The prior art reference is silent about the surface nanometer functional structure is branched from nanostructure nor does it mention it is applied to a side of the nanostructure. Since the prior art reference uses the method of vaporization for applying the nanodots onto the nanostructure, such method is the same as the applicant's method (page 7 of specification). It would have been obvious to have a surface nanometer functional structure branched from the nanostructure or be onto a side of the nanostructure (as can be seen in the combination of Figures a & b).

#### ***Response to Arguments***

7. Applicant's arguments filed on November 17, 2004 have been fully considered but they are not persuasive. Applicant disagrees the art rejections and raises the following issues:

- A. Wagner is a 1000 Angstrom whisker, rather than a nanostructure or a nanowire.
- B. Wagner does not relate to the material with a surface nanometer functional structure and should not be used as a prior art.

In respond to the above issues:

- A. Wagner teaches 1000 Angstrom whisker , but Wagner also clearly states that the whiskers can be in a wide range of dimensions (page 89 last line of the left hand column). In Fig. 1b, the silicon crystal in a longitudinal shape is taken as the nanostructure or nanowire.

B. In Fig. 1b, the vapor deposited Au-Si liquid alloy is taken as the surface nanometer functional structure or the nanodot.

Wagner clearly is a reference which is in the same field as the present invention.

***Conclusion***

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (571) 272-1538. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Cathy Lam  
Primary Examiner  
Art Unit 1775

cfl  
February 7, 2005